



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US83/01978 (22) International Filing Date: 16 December 1983 (16.12.83) (31) Priority Application Number: 450,922 (32) Priority Date: 20 December 1982 (20.12.82) (33) Priority Country: US (71)(72) Applicant and Inventor: FIMA, Raoul, G. [US/US]; 8138 E. Morgan Trail, Scottsdale, AZ 85258 (US). (74) Agent: SCHROEDER, Robert, A.; Fulwider, Patton, Rieber, Lee & Utecht, 2400 Equitable Plaza, 3435 Wilshire Blvd., Los Angeles, CA 90010 (US). (81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), JP, LU (European patent), NL (European patent), SE (European patent).</p>		<p>Published <i>With international search report.</i></p>
<p>(54) Title: INTERMITTENTLY ILLUMINATED FISHING LURE</p> <div data-bbox="324 1176 1364 1722"> </div> <p style="text-align: right; font-size: 1.5em;">Best Available Copy</p> <p>(57) Abstract</p> <p>A fishing lure (10) has an elongated body (12) to be pulled through the water that carries an LED (32) or other electrically energized light source. Within the body is a chamber (50) in which a contact (54), preferably a metal ball (54) or mercury drop, is freely movable in all directions. Upon simultaneously engaging two stationary contacts (46) in the chamber (50), the movable contact (54) completes a circuit to cause the LED to be energized by a battery (34).</p>		

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INTERMITTENTLY ILLUMINATED FISHING LUREFIELD OF THE INVENTION

The present invention relates to illuminated fishing lures and, more particularly, to lures that are illuminated intermittently as they are pulled through the water.

BACKGROUND OF THE INVENTION

It has been recognized that fishing lures are potentially more effective in attracting fish if they are illuminated intermittently. One such lure is described in the inventor's previously issued patent No. 4,347,681, entitled "Intermittently Illuminated Fishing Lure with Traveling Electrical Contact".

The inventor has determined that the rate at which the lure flashes is of considerable importance. It is believed that a lure that flashes with a regular periodicity produces an unnatural effect that does not help to maximize its attractive power. Instead, the flashing of a lure should be related in some way to its action in the water. The flash rate should be neither too fast nor too slow and the flashing should continue regardless of the speed or attitude of the lure. Previous attempts to meet these objectives have not been entirely satisfactory.

SUMMARY OF THE INVENTION

According to the present invention, the above objectives are met by a lure having a body that contains a chamber in which a contact is freely movable in all directions. Preferably, the contact is



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a metal ball that bounces off the sides of the chamber and remains in constant motion as the lure is pulled through the water. Alternatively, a drop of mercury may be used as the movable contact member.

5 A pair of stationary contacts are spaced apart at such a distance that they can be engaged simultaneously by the movable contact, thus completing a circuit to energize a light source, preferably an LED, carried by the body. The lure may include a
10 spoon projecting from the front end or other provisions to cause constant oscillation of the body as it is pulled through the water, thereby keeping the movable contact active.

15 In one form of the invention, the chamber is cylindrical, preferably having its longitudinal axis disposed generally vertically. The floor of the chamber is flat and circular, and the stationary contacts project upwardly from the floor. The length of the chamber is sufficient that the movable contact
20 can pass over the stationary contacts without engaging the stationary contacts.

Other features and advantages of the present invention will become apparent from the following description, taken in conjunction with the
25 accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a pictorial view of a fishing lure that embodies the present invention;

30 FIG. 2 is a cross-sectional view of the lure taken vertically and longitudinally along the center



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as indicated by the line 2-2 in FIG. 1;

FIG. 3 is a cross-sectional view of the chamber taken horizontally as indicated by the line 3-3 in FIG. 2; and

5 FIG. 4 is another cross-sectional view of the chamber taken vertically as indicated by the line 4-4 in FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A fishing lure 10, shown pictorially in FIG. 10 1, has an elongated plastic body 12 of a generally fish-like configuration. A spoon 14 projects forwardly and downwardly from the front of the body 12, the spoon having a concave top surface and producing an oscillating movement of the lure 10 as it 15 is pulled through the water by a line 16, as is well known in the art. Two sets of hooks 18 and 20 hang from the body 12 near the front and at the rear.

The body 12 is hollow and is molded in the form of two plastic halves that form a seam 20 running along the top and bottom of the lure 10 from front to back. Thus, the cross-sectional view of FIG. 2 is taken along this seam and shows only one half 12(a) of the body 12. The illustrated half (12(a) defines sockets that receive pins 22 projecting from 25 the unshown half to hold the lure 10 together. Recesses 24 and 26 defined by the body 12 facilitate attachment of the hooks 18 and 20, respectively, and a larger recess 28 facilitates attachment of the spoon 14.

30 The lure 10 has two transparent eyes 30 that can be illuminated by an LED 32 mounted within the body 12. Fiber optic cables (not shown) connect the



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LED 32 to the eyes 30. It will be understood that other areas of the lure 10 can be illuminated in the same manner.

Power for the LED 32 is supplied by two
5 small batteries 34 contained within a chamber 36 that opens downwardly through the bottom of the body 12. A plug 38 and an O-ring 40 seal the cavity in a water-tight manner after the batteries 34 have been inserted. The batteries 34 are engaged by a pair of
10 contacts 42 and 44 that form part of a circuit by which the batteries are connected to the LED 32.

To complete the circuit and energize the LED 32, it is necessary to bridge the gap between two stationary contacts 46 that extend upwardly through a
15 floor 48 of a chamber 50 within the body 12. The chamber 50 is cylindrical and is supported within the body 12 by a horizontal plate 52. When the lure 10 is in its normal "in use" position, the longitudinal axis of the chamber 50 is vertical and the chamber
20 projects upwardly through an aperture in the plate. The floor 48 of the chamber 50 is formed by a separate disc-like plastic member and is flat and circular.

Within the chamber 50 is a spherical movable contact, preferably a steel ball, 54. Being
25 considerably smaller than the chamber 50, it is freely movable in all directions and can pass over the stationary contacts 46 without engaging them. It cannot, however, pass between the stationary contacts 46 and is thus capable of engaging both stationary
30 contacts simultaneously to complete the circuit. This optimal relationship of the ball to the size and shape of the chamber produces the sought-after intermittent illumination. As an alternative



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construction, the steel ball 50 can be replaced by mercury drop that is of generally the same dimensions.

As the lure 20 is pulled through the water, the ball 54 bounces about the interior of the chamber 50 in a substantially random manner. When it strikes the two stationary contacts 54, it causes the LED 32 to be illuminated. The illumination is thus somewhat erratic in a natural and desirable manner, but the flash rate that results is directly related to the speed of the lure through the water and to the frequency of oscillation of the lure 10. When the lure 10 is not in use, it is simply positioned upside down so that the movable contact 54 moves to the top of the chamber 50 and does not touch the stationary contacts 46, thus avoiding a drain on the batteries 34.

It will be noted that the lure 10 of the present invention is extremely simple, rugged and trouble free. Manufacturing costs are minimized because there is no need to maintain close tolerances. It operates effectively at a wide variety of lure speeds and with a variety of types of lure actions.

It will be appreciated from the foregoing that, while a particular form of the invention has been illustrated and described, various modifications can be made without departing from the spirit and scope of the invention.



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I CLAIM:

1. A fishing lure comprising:
a body to be pulled through the water;
an electrical light source carried by said body;
5 a battery disposed within said body;
a chamber disposed within said body;
a contact member freely movable in all directions within said chamber;
at least two stationary electrical contacts
10 disposed within said chamber, said stationary contacts being spaced apart by a predetermined distance such that said movable contact member can engage both of said stationary contacts simultaneously; and
circuit means for intermittently energizing
15 said light source in response to simultaneous engagement of said stationary contacts by said movable contact member.
2. The fishing lure of Claim 1 wherein said chamber is cylindrical having its longitudinal axis disposed generally vertically.
3. The fishing lure of Claim 1 wherein said movable contact member is a sphere.
4. The fishing lure of Claim 1 wherein said movable contact member is a mercury drop.
5. The fishing lure of Claim 1 wherein said stationary contacts project upwardly into said chamber.
6. The fishing lure of Claim 5 wherein the height of said chamber is such that said movable



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contact member can pass over said stationary contacts without engaging said stationary contacts.

7. The fishing lure of Claim 5 wherein said chamber has a flat floor from which said stationary contacts project upwardly.

8. The fishing lure of Claim 1 wherein said chamber is cylindrical having a flat circular floor from which said stationary contacts project upwardly, the height of said chamber being such that
5 said movable contact member can pass over said stationary contacts without engaging said stationary contacts.

9. The fishing lure of Claim 8 wherein said movable contact member is a sphere.

10. The fishing lure of Claim 9 wherein said predetermined spacing between said stationary contacts is such that said movable contact member cannot pass between said stationary contacts.

11. The fishing lure of Claim 8 wherein said movable contact member is a mercury drop.

12. The fishing lure of Claim 11 wherein predetermined spacing between said stationary contacts is such that said movable contact member cannot pass between said stationary contacts.

13. The fishing lure of Claim 1 further comprising means for causing said body to oscillate as it is pulled through the water, thereby causing movement of said movable contact member.



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14. A fishing lure comprising:

an elongated plastic body to be pulled
through the water;

means for causing said body to oscillate
5 as it is pulled through the water;

an LED disposed within said body;

a battery disposed within said body;

a cylindrical chamber with a flat circular
floor disposed within said body;

10 a spherical metal contact member disposed
within said chamber and freely movable in all
directions therein in response to oscillation of
said body;

a pair of stationary electrical contacts
15 projecting upwardly from said floor, said stationary
contacts being spaced apart by a predetermined
distance such that said spherical contact member
can engage both of said stationary contacts
simultaneously, said spherical contact member being
20 dimensioned such that it cannot pass between said
stationary contacts but it can pass over said
stationary contacts without engaging said stationary
contacts; and

circuit means for intermittently engaging
25 said LED in response to simultaneous engagement of
said stationary contacts by said spherical contact
member to energize said LED.

15. A fishing lure comprising:

an elongated plastic body to be pulled
through the water;

means for causing said body to oscillate
5 as it is pulled through the water;

an LED disposed within said body;

a battery disposed within said body;

a cylindrical chamber with a flat circular



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floor disposed within said body;

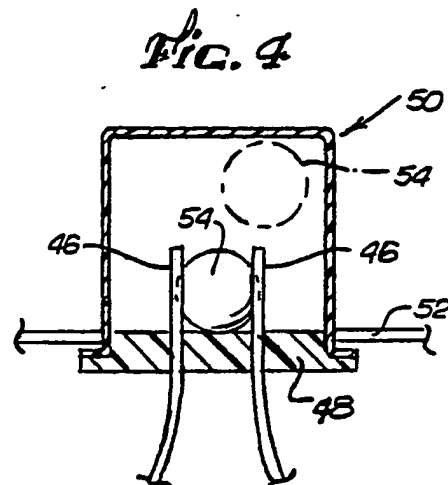
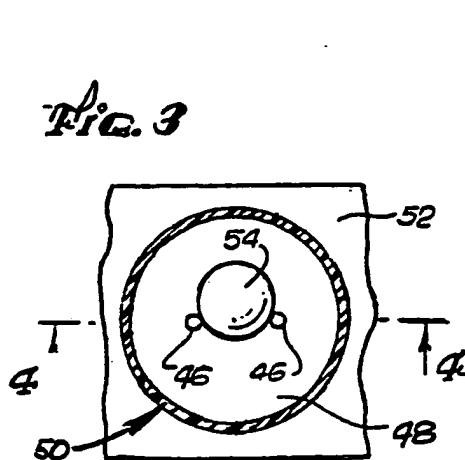
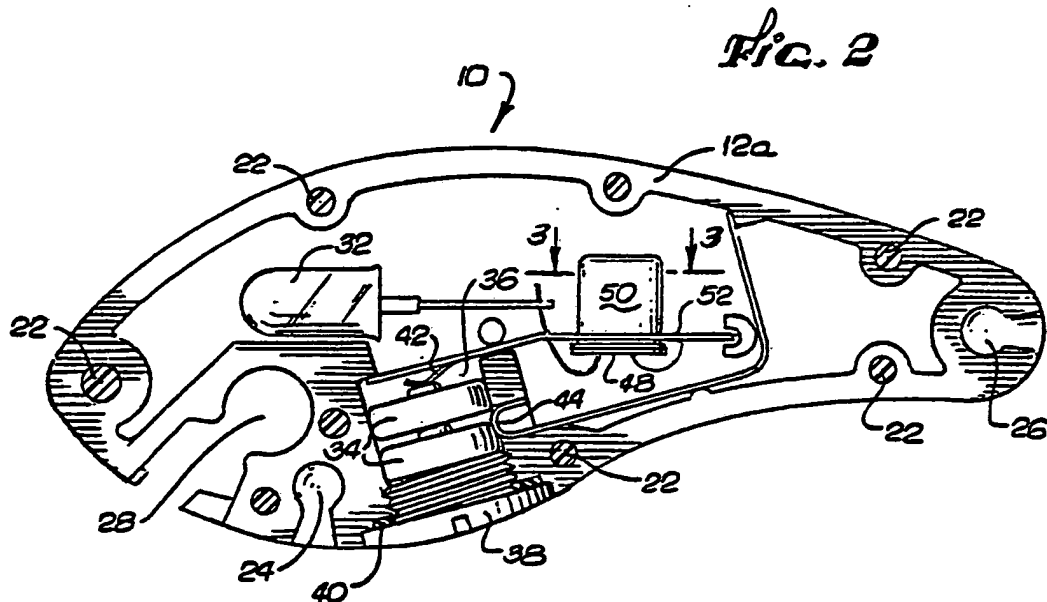
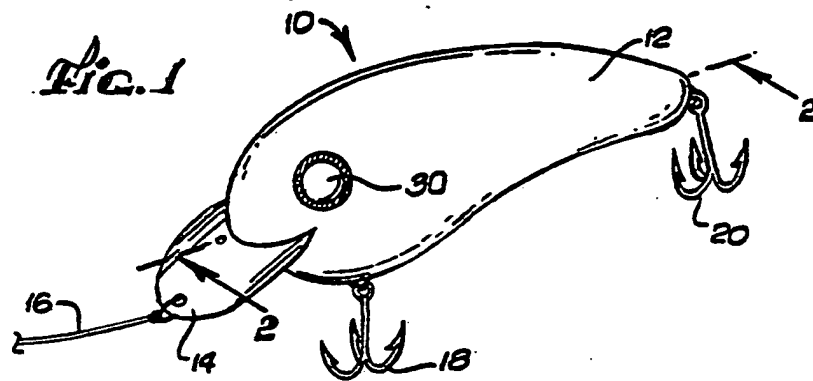
10 a mercury drop to serve as a contact member disposed within said chamber and freely movable in all directions therein in response to oscillation of said body;

15 a pair of stationary electrical contacts projecting upwardly from said floor, said stationary contacts being spaced apart by a predetermined distance such that said mercury drop can engage both of said stationary contacts simultaneously, said mercury drop being dimensioned such that it
20 cannot pass between said stationary contacts but it can pass over said stationary contacts without engaging said stationary contacts; and

 circuit means for intermittently engaging said LED in response to simultaneous engagement
25 of said stationary contacts by said mercury drop to energize said LED.



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SUBSTITUTE SHEET



INTERNATIONAL SEARCH REPORT

International Application No PCT/US83/01978

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) * According to International Patent Classification (IPC) or to both National Classification and IPC Int. CL ⁹ A01K 85/01 U.S. CL 43/17.6																																
II. FIELDS SEARCHED <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Minimum Documentation Searched ⁴</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border: 1px solid black; text-align: left;">Classification System</th> <th style="border: 1px solid black; text-align: left;">Classification Symbols</th> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">U.S.</td> <td style="border: 1px solid black; padding: 5px;">43/17.5, 17.6 200/275, 277, 61.52 Dig 20&29</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁶</div>			Classification System	Classification Symbols	U.S.	43/17.5, 17.6 200/275, 277, 61.52 Dig 20&29																										
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; border: 1px solid black;">Category *</th> <th style="width: 60%; border: 1px solid black;">Citation of Document, ¹⁸ with indication, where appropriate, of the relevant passages ¹⁷</th> <th style="width: 30%; border: 1px solid black;">Relevant to Claim No. ¹⁸</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Y</td> <td>U.S. A, 4,227,331, Ursrey et al, 14 October 1980</td> <td style="text-align: center;">1-15</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>U.S., A 2,897,623, Flournoy 4 August 1959, Fig. 2&3 * specifications</td> <td style="text-align: center;">1-15</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>U.S., A, 3,077,046, Murray, 12 February 1963, Mercury Switch</td> <td style="text-align: center;">1-15</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>U.S., A, 4,347,681, FIMA, 7, September 1982</td> <td style="text-align: center;">1-15</td> </tr> <tr> <td style="text-align: center;">A</td> <td>U.S., A, 2,997,557, Gillmor et al, 22 August 1961</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>U.S., A, 4,006,452 Giacino, 01 February 1977</td> <td></td> </tr> <tr> <td style="text-align: center;">Y</td> <td>U.S., A, 3,935,701, Ya Mauchi et al, 3 February 1976, Switch</td> <td style="text-align: center;">1-15</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>U.S.A, 4,043,033 Yeo, 23 August 1977 Switch</td> <td style="text-align: center;">1-15</td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 3,927,286 Fohl, 16 December 1975</td> <td></td> </tr> </tbody> </table> <div style="margin-top: 10px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </div> </div> </div>			Category *	Citation of Document, ¹⁸ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸	Y	U.S. A, 4,227,331, Ursrey et al, 14 October 1980	1-15	Y	U.S., A 2,897,623, Flournoy 4 August 1959, Fig. 2&3 * specifications	1-15	Y	U.S., A, 3,077,046, Murray, 12 February 1963, Mercury Switch	1-15	Y	U.S., A, 4,347,681, FIMA, 7, September 1982	1-15	A	U.S., A, 2,997,557, Gillmor et al, 22 August 1961		A	U.S., A, 4,006,452 Giacino, 01 February 1977		Y	U.S., A, 3,935,701, Ya Mauchi et al, 3 February 1976, Switch	1-15	Y	U.S.A, 4,043,033 Yeo, 23 August 1977 Switch	1-15	A	US, A, 3,927,286 Fohl, 16 December 1975	
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IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border: 1px solid black; padding: 5px;"> Date of the Actual Completion of the International Search ¹ <div style="text-align: center; font-size: 1.2em;">March 5, 1984</div> </td> <td style="width: 50%; border: 1px solid black; padding: 5px;"> Date of Mailing of this International Search Report ² <div style="text-align: center; font-size: 1.2em;">15 MAR 1984</div> </td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;"> International Searching Authority ³ <div style="text-align: center; font-size: 1.2em;">ISA/U.S.</div> </td> <td style="border: 1px solid black; padding: 5px;"> Signature of Authorized Officer ²⁰ <div style="text-align: center; font-size: 1.2em;"><i>Merwin Jordan</i></div> </td> </tr> </table>			Date of the Actual Completion of the International Search ¹ <div style="text-align: center; font-size: 1.2em;">March 5, 1984</div>	Date of Mailing of this International Search Report ² <div style="text-align: center; font-size: 1.2em;">15 MAR 1984</div>	International Searching Authority ³ <div style="text-align: center; font-size: 1.2em;">ISA/U.S.</div>	Signature of Authorized Officer ²⁰ <div style="text-align: center; font-size: 1.2em;"><i>Merwin Jordan</i></div>																										
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